

ELECTRICALLY DRIVEN APPARATUS FOR  
EJECTING INJECTION MOLDED PARTS

This is a 371 of PCT/US00/12113, filed May 2, 2000, which is a Continuation in Part of US application 09/303,938, filed May 3, 1999, now abandoned.

TECHNICAL FIELD

The present invention relates to injection molding machines for molding plastics articles and, more particularly, to a mold clamp system for an injection molding machine, wherein the clamp system includes an electrically-operated ejector mechanism for separating the molded part from a molding surface and for ejecting the part from the mold.

BACKGROUND ART

Injection molding machines are utilized for molding plastic parts that range from simple to quite complex configurations. In the course of injection molding a part, two cooperating mold halves that define a mold cavity corresponding to the part to be molded are brought together in contacting relationship. The mold halves are held together under pressure so that when molten plastic material is injected into the mold cavity, a molded part conforming to the shape of the mold cavity is produced. Often the molded part will adhere to a surface of the mold cavity, and it must be physically separated from the surface so that the mold can be employed during subsequent molding cycles to form additional parts.

Typically, one or more ejector pins assist removal of molded parts from an injection mold cavity. The ejector pins are slidably carried in one of the mold halves, usually the movable mold half, and they are movable into and out of the mold cavity so that they can be brought into contact with a molded part and thereby push the molded part away from the molding surface. In the past, when most injection molding machines were hydraulically-operated, the ejector pins were actuated by an hydraulic linear actuator that caused the pins to extend into the mold cavity during a ejection operation, and to retract from the mold cavity after a part had been separated from the molding surface and ejected from the mold half.

With the advent of completely electrically-powered injection molding machines, electric motors and mechanical drive systems replace hydraulically-operated systems, including hydraulic pumps, hydraulic cylinders, and the like. Such motors and drive systems provide power for the necessary rotary and linear movements of the operative parts of the injection molding machine. Thus, in an all-electric machine a different mechanism must be employed to actuate the ejector pins. In that regard, one way to actuate the ejector pins electrically is to provide a screw and nut arrangement to convert the rotary output of an electric motor to linear movement, thereby causing the ejector pins to extend into and to retract from the mold cavity. Providing the power for the ejection function in that manner,